# AERODYNAMICS COMPUTER LABORATORY

The Aerodynamics Computer Laboratory supports the development, validation and application of computational aerodynamic methods ranging from empirically based methods up to the most sophisticated Computational Fluid Dynamic (CFD) methods. The computer equipment inside the lab, as well as its high-speed digital connections to all of the major national off-site computer facilities, provides the capability to conduct leading-edge aerodynamic research as well as provide responsive aerodynamic support to air vehicle acquisition.

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Current capabilities include the development and application of parallel CFD codes that solve the full Navier-Stokes equations of fluid mechanics using state-of-the-art turbulence models. These equations and turbulence models accurately describe the physics of viscous, compressible flows from subsonic to supersonic speeds and high Reynolds numbers. The laboratory assets are currently being used to calculate the aerodynamic flow over complete aircraft configurations, targets, aircraft components, and unique shapes for which there are no established databases.

Facility Description: The facility is housed within building 2187 laboratory space and consists of a collection of computers and high-speed digital network connections. The two main computers are the Silicon Graphics Incorporated (SGI) ONYX and Power Challenge machines. The ONYX machine has eight R8000 RISC CPU's, a total of 1,280 GigaBytes of shared memory, 81 GigaBytes of hard disk space, a CDROM drive, an 8mm digital tape backup drive, and graphics capable of rendering high-speed animations of flow fields over complex configurations. The Power Challenge machine has eight R4400 RISC CPU's, a total of 1,024 GigaBytes of shared memory, and 45 GigaBytes of hard disk space. A RAID Disk Vault is connected to the Power Challenge which is capable of housing an additional 155 Gigabytes of data.
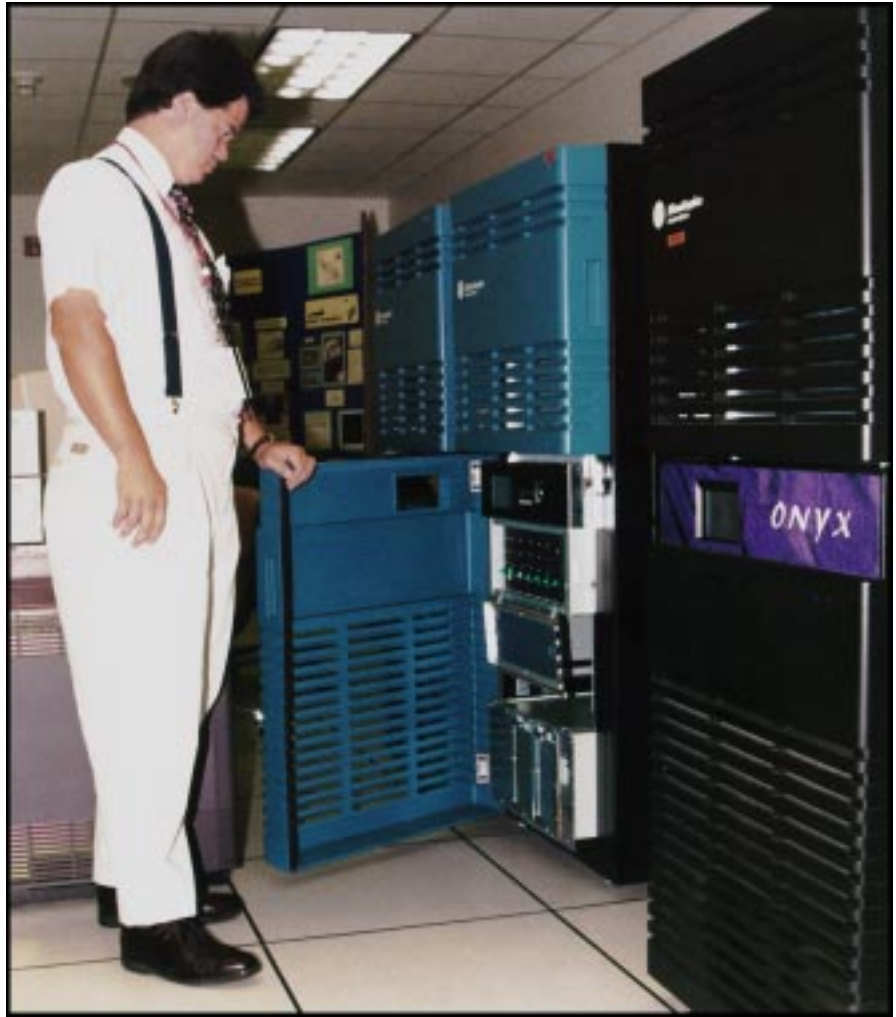
In addition to these two large machines, there are two disk-side workstations and a PC for pre- and post-processing. A critical feature of the laboratory is the interconnectivity between the computers within the lab itself, to the desktop workstations in the engineer's workspaces and to the fastest parallel super-computers available in the world at remote sites. Within the laboratory there is an ethernet connection between each computer. The Power Challenge is connected to a high speed router which is connected to the base's fiber optic backbone using fiber optic technology. This facilitates a high speed connection, independent of the building's ethernet, to the DoD Major Shared Resources, other government labs, industry and universities via the Defense Research and Engineering Network (DREN). In addition, there is a separate dedicated router and high-speed connection to NASA's AERONET which is completely independent of the building and base network.

For more information contact the Aerodynamics Computer Laboratory at the Naval Air Warfare Center Aircraft Center, Patuxent River, MD 20670, at 301-342-8548.